

## CO-EVOLVING MORPHOLOGIES IN SUB-SAHARAN AFRICA.

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### ABSTRACT

*African cities have been catalyzing attention since statistical data show that they will hold about 21% of the world's population in the coming years. This increase in urban dwellers implies a rise in the demand for infrastructure, services and urban housing. Evidence of the phenomena is tangible, new increasingly large-scale morphologies can be appreciated all over the African continent. The fast changes seen in the continent in the last decades do not uniformly affect the built environment, making these morphologies to be in a constant state of "transition". Two main morphological singularities co-exist and co-evolve in these contexts: informal settlements and new large-scale planned projects. For this paper, two mega-cities in the making: Luanda and Lagos; are re-visited in different scales. These samples from southern and western parts of the continent become a laboratory to observe contemporary urbanization phenomena through spatial lenses. Using geographic information systems and urban morphology as a decoding artifact, the case studies are analyzed as they develop in time to understand their spatial character and the current dynamics of their development. In this study, urban morphology serves as an instrument to map, analyze and compare the transitional built environments and highlight the contrasting morphological characteristics of these developments.*

**Keywords:** Transitional morphologies, informal settlements, Africa, new cities

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### INTRODUCTION

Meta-geographical visions of an "urban world" animate contemporary discussions. Current social, economic and political changes drive the global urbanization process. This process is creating uneven spatial development, and increasing socioeconomic diversity (McGee, 2013). Statistical data suggest that the 21st century would represent the final phase of the global transition from rural to urban (UN, 2014; 2018, LSE; 2018; Keil 2013; 2018). The number of people living in "urban" settings has increased exponentially in the past century; population growth and migration are projected to add 2.5 billion people by 2050 to the world's urban population. A major part of this growth is expected to happen in Asia and Africa. Due to poor land-use planning and not enough affordable housing, the rapid urbanization of the Global South is characterized by a prevalence of informal or unplanned urban growth (Mota & Gameren, 2018, Dovey, 2018).

A recent flow of research in Post-Colonial studies has appeared as a critic to the portrait that has been given to cities in the Global South when explained by Western centric urban theories. These studies argue for the possibility of re-visioning how these cities are discussed and written about to speak back to theoretical and practical concerns. Postcolonial theorists' plea for theorizations and examples coming from the South. Moving away from a euro centrist view of cities brings to light dynamics that inform of a different approach to urban life (Robinson, 2010, Bunnell et al., 2012; Parnell and Robinson, 2012; Robinson and Roy, 2016).

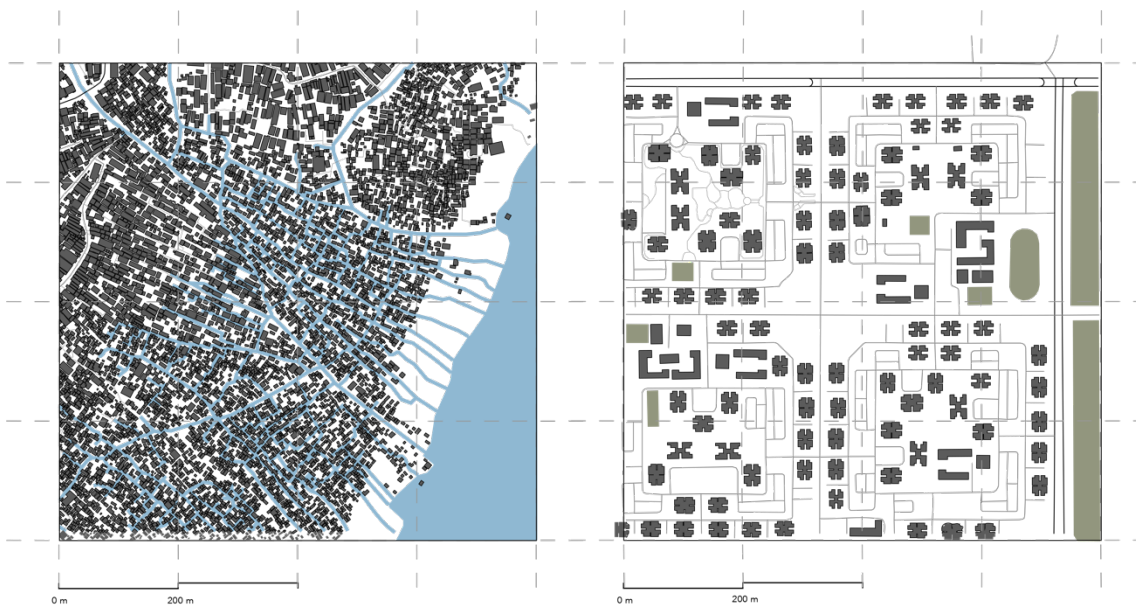
According to predictions, Cities in the African continent will hold more than 1.3 billion people in the coming years (UN DESA, 2014). African cities are still typically studied through lenses of development which decisively pushes for references to statistical data. With 7 617 urban agglomerations of more than 10 000 inhabitants identified by Africapolis in 2015, Africa is urbanising at an incredibly rapid pace. Africa's urban transition is very diverse and multifaceted. Its

drivers, patterns and outcomes are not following uniform and past processes (Africapolis, 2020). This research work focuses on morphological aspects of these overwhelming numbers and for this paper, two cities in the context of Sub-Saharan Africa become a laboratory of observation of urban forms and the phenomena of urbanization.

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## TRANSITIONAL MORPHOLOGIES

The term “transitional” refers to elements in a state of change or in the state of becoming. This term is useful to describe the current situation in the African context and is taken as a filter to analyze morphologies in fast-growing cities by including the component of time. One of the main challenges that the African continent faces as a consequence of the rapid growth of the urban population is one of affordable housing. In the case of Africa, two scenarios are relevant: the first one is the continuous growth of informal settlements due to the lack of resources and affordable housing, and the second one refers to the phenomena of private investments in housing and urban developments from foreign and domestic companies that have appeared all over the continent in the last decades. In morphological terms, two singularities are identifiable and extremely contrasting (Fig 1).



**Figure 1. Morphological singularities recognized in the African urban context. Left: Makoko, Nigeria. Right: Kilamba new town, Angola**

The first singularity evokes a more or less stereotypical impression of built environments: high-density alignments of small improvised shelters. Sub-Saharan Africa is rich in its diversity of forms of informal settlement and has the highest percentage of people living in these types of settlements (UNCHS, 2001). As for the second type, cases of real estate speculation, middle-class residential projects, closed communities, new capitals, financial centers, and new industrial sites have appeared in recent decades. Some of the recognized transitional morphologies are part of large mega-regions, others are attempts to import urban lifestyles into previously non-urbanized areas (Van Noorloos & Kloosterboer)

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## INFORMAL- FORMAL MORPHOLOGIES

The first morphological singularity recognized in these contexts is informal settlements. Informality has become a universal term used to describe an increasingly vast category of forms, methods, and systems of living in urban environments. Often referred to as “illegal housing” and repeatedly

considered as a consequence of poverty, this type of settlement is an important part of the urbanization process in developing countries (McGee, 2013). This type of occupation may vary on their formal arrangement but their commonality is that they operate outside the legal frameworks of the city. (Roy and AlSayyad 2004). Some definitions often fail to notice that these types of seemingly disorganized processes have a historical lineage that can be traced to the beginning of urban organizations.

The second singularity is large scale planned projects. These developments are often referred to as “African urban fantasies” with outdated, unrealistic, and unfair characteristics (Watson, 2014). In some cases, these are projects built up from scratch usually as self-contained enclaves in the outskirts of existing cities; in other cases, city centers are improved and converted into new cities (Lumumba J, 2013; Van Noorloos & Kloosterboer, 2018). These new developments have been criticized and many have warned that the characteristics of these new projects and their insertion into specific contexts will probably make them unsuitable for solving Africa’s urban development problems.

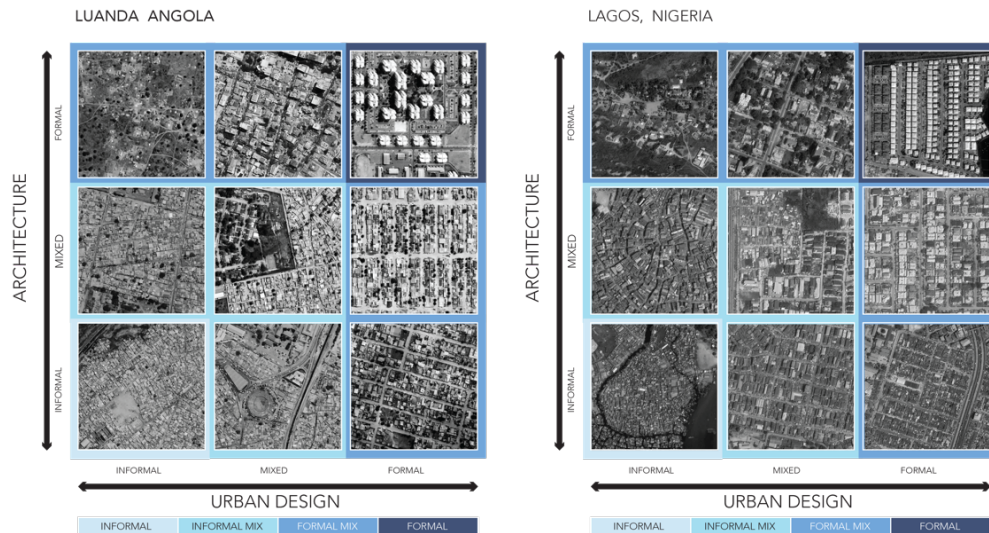
The Case studies presented in this paper illustrate processes of urbanization that involve new developments and informal ones. In this sense, the recent “African urban fantasies” (formal) and their surrounding (informal) represent transitional morphologies in the making.

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## METHODOLOGY

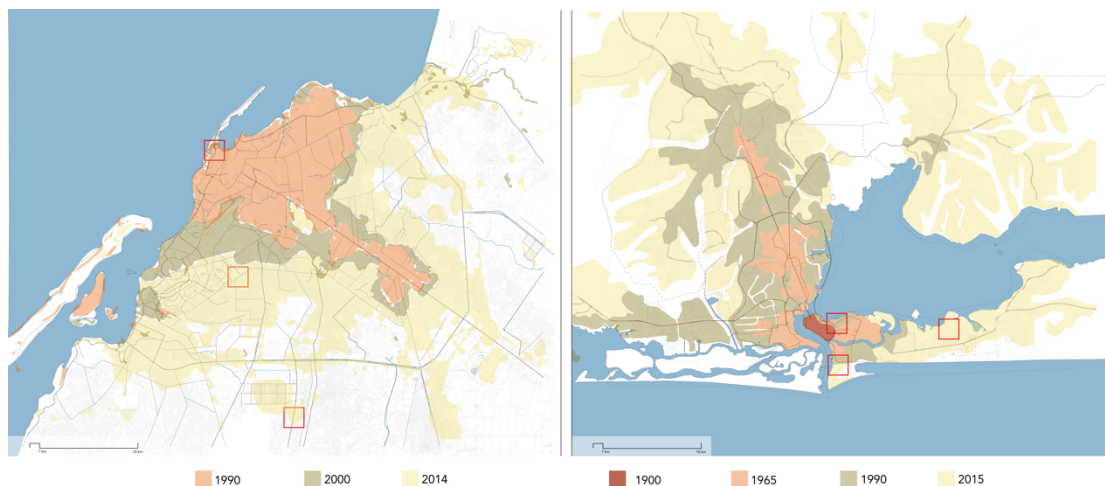
This paper uses examples taken from two of the most populated cities in the Sub-Saharan area (Luanda and Lagos) where informal settlements are projected to grow the most in the coming years (UNHabitat, 2008). Formal and informal morphologies carry with them social, legal, and economic differences. However, for the interest of this study, only morphological characters are highlighted. Urban informality and its morphological/spatial characteristics rarely appear in official maps (Robinson, 2002), this represents a challenge. Image-based studies of informal settlements through remote sensing have emerged as a substantial research field to develop techniques for detecting and mapping informal morphologies using satellite imagery (Graesser et al. 2012). In this sense, geographic satellite images are used as a tool to gather information for the collection of samples of urban enclaves.

The starting point of the study is based on the recognition of how diverse the morphological results of urban processes are in Global South contexts. This study takes the proposal of the “multi-scale typology of informal morphologies” developed by Dovey & Kamalipour (2018) as a starting point for the aforementioned recognition (fig. 2). This typology is organized according to a distinction between the formality of the architecture and the urban design, between the buildings and the street/block layout. The goal of the scheme is to develop a way to compare the morphological characteristics of samples taken within a specific city. The goal is not to set a clear separation between formal and informal morphologies but to make it evident that these morphologies are intertwined (Dovey & Kamalipour, 2018).



**Figure 2. Typology of morphologies (Based on Dovey & Kamalipour) Left: Luanda. Right: Lagos**

An analytical approach and deductive observation of satellite images obtained from open sources help to define the areas used to exemplify the phenomena. The presented cities are observed in different scales (territorial scale and urban scale) and in different time frames. In the context of urban analysis, cartographical images are crucial for the analytical deconstruction of urban formation (Conzen, 1960). A comprehensive representation of the city is the second fundamental step employed for the morphological analysis in this context. Data from the “Atlas of urban expansion” is taken as a base to understand the expansion of urban forms in different periods in both cities. (Fig. 3)



**Figure 3. Urban extend in different periods and selected samples. Left: Luanda. Right: Lagos**

The third step of the analysis takes 3 samples of 1.5km x 1.5 km from each city. The selected samples come from areas where urban form variations can be appreciated clearly. The approach chosen for the morphological analysis regards the following variables:

1. Streets and their arrangement: these elements represent the most stable one of urban fabrics (Oliviera, 2016). In these contexts, paved streets are a sign of consolidated infrastructure. In informal settlements, it is common to see that the street arrangements appear as a result of the incremental room by room morphologies.

2. Formal – Informal Morphologies, & open spaces in them: In an urbanization process, the definition of plots and large division of territory have tangible repercussions in the urban form since they condition future developments in terms of building types, open spaces, and urban landscapes.

Advances in geographic information systems and satellite imagery provide tools and images to analyze the changing morphology of cities. The study employs a comparative analysis of the samples in different years. Through the study of an enclave or piece of city in time, effects in the urban form of the city can be deduced. In this sense, the morphology of a city provides a consistent descriptive language for the built environment and facilitates rigorous comparison.

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## ANALYSIS OF SAMPLES AND FINDINGS

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### LUANDA, ANGOLA

Located in South-Central Africa, Angola has one of the highest levels of urbanization in the African continent with 63.5% of its population living in urban areas. Its capital city Luanda counts for almost half of the urban population of the country and is the largest city. This city is presumed to be a megacity in the making with a projected population of 8.9 million in 2025 (UN, 2014). The informal settlement's population in the city is very high and was estimated to be 86.5% in 2005, informal settlements are known as musseques. (White et al, 2015).

The first sample chosen comes from an area consolidated in the center of Luanda, down the coastal highway, and past the fort built by Portuguese colonialists on the hill. The other two samples come from the areas once considered as "outside" the city. (Fig.4)

#### Samples:

A. The first sample is taken from the consolidated area in the center of the city. Administrative structures used during Portuguese colonial rule are present in the area and represent the formal morphologies of this sample. The streets and their arrangement are consolidated. The presence of informal morphologies is limited to the bay area and signs of evictions and relocations of these settlements are present when satellite images are compared. Signs of reclaimed land are also visible and it is in these marginal areas where the development of informal settlements appears.

B. The second sample is taken from an area that showed exponential development in the first years of the 2000s. It is only in the formal residential enclaves where a durable material is used for the street conformation. The extensive occupation of informal settlements in the area makes evident the need for housing during those years. The density of the informal morphologies in this sample makes open public spaces scarce or even absent, giving the sinuous streets or paths the role of the public realm. In this sample and with the diachronic overview of the area it is evident that architecture and urban design co-evolve incrementally.



C. The third sample shows an area furthest to the consolidated center. This area was considered and labeled as rural until 10 years ago; recent urban projects and developments have marked the areas once considered as “outside” with projects of housing constructed for low-income groups. However, when low-income housing remains financially inaccessible, unregulated settlements grow adjacent to formal morphologies. The parallel development of these morphologies shows two completely diverse ways of living.

## LAGOS, NIGERIA

Located in West Africa, today Nigeria is the most populous country in Africa. According to Africapolis, Nigeria accommodates 1 158 urban agglomerations, making it the country with the largest number of urban agglomerations in the continent. Lagos appears as the most populous city in the country. Just like many other large cities in the continent, Lagos struggles with population growth, urban development, and the long for urban modernity. Lagos witnessed largely unplanned urban expansion that changed the configuration of its original lagoon setting to a vast expanse of low-rise developments and different informal settlements. (Gandy, 2006).

The samples taken from this city exemplify modifications to the urban environment by mega-projects. The first two samples are located in the original lagoon setting developed in the 1900s but in continuous transition. The last sample illustrates the dynamics of areas once considered as “outside” the city and developed in the last decades. (fig 5)

Samples:

A. The first sample is taken from a consolidated area in the center of the city where the new business district is being developed. Signs of reclaimed land are visible when satellite images are compared. As for now, the projected plots for the new development are visibly greater in dimension compared to the context. The development of important mega projects in this enclave discourages the development of informal settlement.

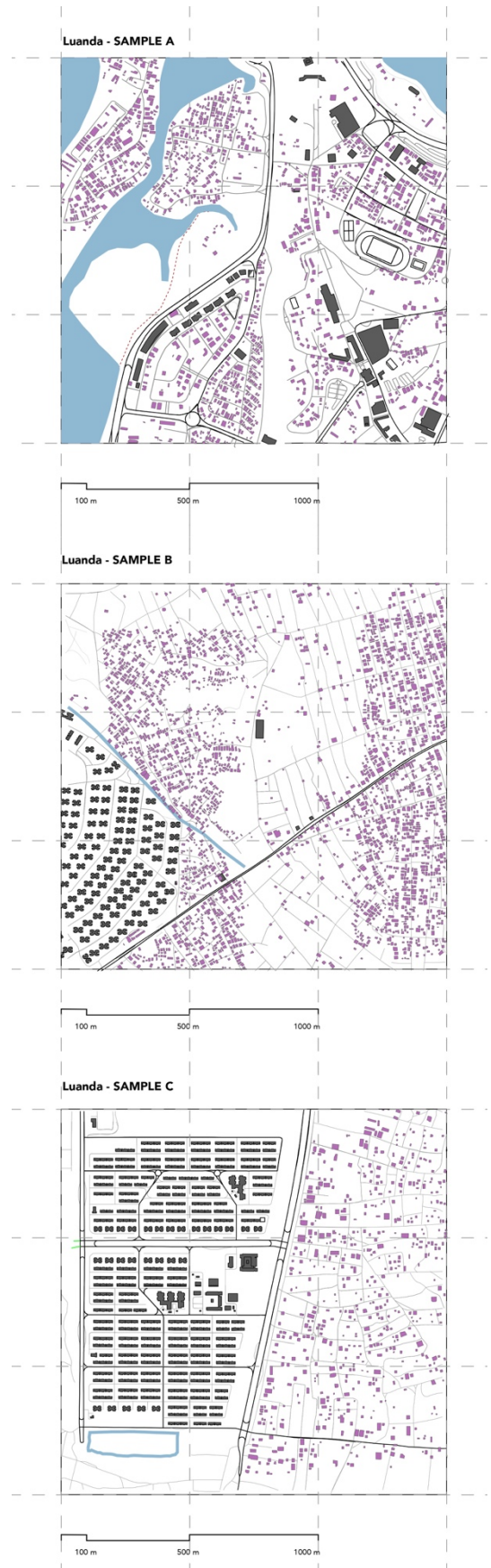


Figure 4. Luanda Samples

B. The second sample shows a consolidated area where infrastructure appears as a definer of the urban tissue. Again, in this sample reclaimed land is visible and the presence of on-going residential projects make the area to be in constant and transition.

C. The third sample shows an area furthest to the consolidated center that showed exponential residential development. The connotation of outskirts from the city center made formal housing morphologies to develop as private enclaves. It is interesting to see the patterns of crooked street alignments of pre-existing informal areas surrounded by new projects.

## CONCLUSIONS

The speed and effects of urbanization bring with them overwhelming issues. In this sense, understanding the dynamics of urbanization processes, to later take findings into account for future developments, is one of the greatest challenges society is faced with at the moment. The opportunity of seeing the overwhelming changes from a spatial and morphological point of view opens opportunities for new reflections. The current physical conditions of a city are the result of various events that change its morphology in time. The reconstruction of these changes is evident when maps of specific places are compared. An effort to look at the elements that constitute cities in southern areas is made with this research.

As for the presented cities and samples in this paper, the variables used for the analysis decomposed the layers of the urban form in pieces to get a general understanding of how these systems work individually and collectively and how these elements develop in time. The morphological features of the studied urban places can be reduced to a logical system of explanation, which can lead to an understanding of the relationship between urban formal and informal morphologies. One important realization is the acknowledgment of how diverse, transitional and fluid morphologies in these contexts are. A reflection about informality and modernity as a contemporary reality to urban settings in southern contexts comes undoubtedly when comparing the realities.

This paper highlights only partial results of an ongoing mapping research project that aims to frame the spatial character of transitional morphologies. The study uses urban morphology as a tool that allows emerging morphologies to be mapped and compared.

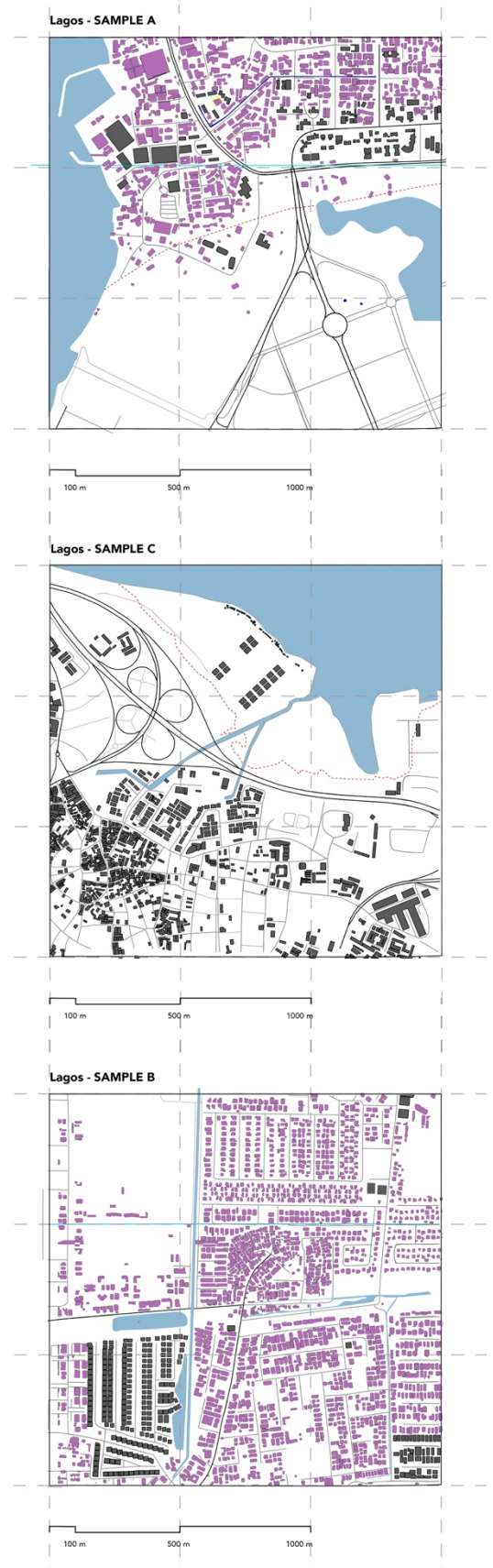


Figure 5. Lagos samples

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